MULTIVOLTAGE PORTABLE BATTERY CHARGER

MVM

User's MANUAL

1. INTRODUCTION

Before starting to use your *Energic plus MVM* battery charger, please take the time to read these instructions carefully.

The owner's manual is an important part of the charger. It's recommended to keep it in good condition for the lifetime of the charger. It should be kept in a dry and clean place, always available to the users.

To indicate important instructions, the following pictures are used:

"Caution: " ***This operation can be dangerous for the user.***

"Attention: " ***This operation is important for the good operation of the charger.***

Inside the charger, this picture is placed near devices connected to input voltage.

The charger is marked with a technical label, reporting the following data:

- **CE mark;**
- **Model;**
- **Serial number;**
- **Weight;**
- **Input voltage;**
- **Maximum input current (A);**
- **Maximum power consumption (KVA);**
- **Input frequency;**
- **Voltage of the battery (output voltage);**
- **Maximum charge current (output current).**

RESPONSIBILITY DISCLAIMER

The manufacturer of the MVM battery charger will not be responsible for damages and/or injuries caused by the charger in these situations:

- **The charger is not installed properly by a qualified electrician;**
- **Maintenance operations are not done by a qualified electrician;**
- **The charger is not used according to the instructions included in this manual;**
- **The charger is not connected to the correct input supply (see data label on the box);**
- **The battery is damaged during the charge;**
- **The charger has been modified without the authorization of the manufacturer;**
- **Non-original spare parts are used in the charger;**
- **Wrong spare parts are used in the charger.**

2. SAFETY INSTRUCTIONS AND WARNINGS

This manual includes instructions and suggestions for the users of *Energic Plus* MVM battery chargers.
The code and the version of this manual are written on the bottom of each page. If you need more copies please specify Code and Version.
Before starting to use your MVM battery charger, please read these instructions carefully.

GENERAL

Battery charging products can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.
Safe practices must be learned through study and training before using this equipment.
Only qualified personnel should install, use, or service this equipment.

SHOCK PREVENTION

Bare conductors, or terminals in the output circuit, or ungrounded, electrically-live equipments can fatally shock a person. To protect against shock, have competent electrician verify that the equipment is adequately grounded and learn what terminals and parts are electrically HOT.

The body's electrical resistance is decreased when wet, permitting dangerous current to flow through the body. Do not work in damp area without being extremely careful. Stand on dry rubber mat or dry wood and use insulating gloves when dampness or sweat cannot be avoided. Keep clothing dry.

INSTALLATION AND GROUNDING - A power disconnect switch must be located at the equipment. Check the data label for voltage and phase requirements. If only 3-phase power is available, connect single-phase equipment to ONLY TWO WIRES of the 3-phase line.
DO NOT CONNECT the equipment grounding conductor to the third live wire of the 3-phase line as this makes the equipment frame electrically HOT, which can cause a fatal shock.
If a grounding conductor is part of the power supply cable, be sure to connect it to a properly grounded switch box or building ground. If not part of the supply cable, use a separate grounding conductor. Don't remove a ground prong from any plug. Use correct mating receptacles. Check ground for electrical continuity before using equipment. The grounding conductor must be of a size equal to or larger than the size of the line conductors.

CHARGING LEADS – Inspect leads often for damage to the insulation. Replace or repair cracked or worn leads immediately. Use leads having sufficient capacity to carry the operating current without overheating.

BATTERY TERMINALS – Do not touch battery terminals while equipment is operating.

SERVICE AND MAINTENANCE – Shut OFF all power at the disconnect switch or line breaker BEFORE inspecting, adjusting, or servicing the equipment. Lock switch OPEN (or remove line fuses) so that the power cannot be turned ON accidentally.
Disconnect power to equipment if it is to be left unattended or out of service.
Disconnect battery from charger.
Measure voltage on capacitors and, if there is any voltage reading, wait 5 minutes before to proceed.

Keep inside parts clean and dry. Dirt and/or moisture can cause insulation failure. This failure can result in high voltage at the charger output.

BURN AND BODILY INJURY PREVENTION

The battery produces very high currents when short circuited, and will burn the skin severely if in contact with any metal conductor that is carrying this current.
Do not permit rings on fingers to come in contact with battery terminals or the cell connectors on top of the battery.
Battery acid is very corrosive. Alwais wear correct eye and body protection when near batteries.

FIRE AND EXPLOSION PREVENTION

When batteries are being recharged, they generate hydrogen gas that is explosive in certain concentrations in air (the flammability or explosive limits are 4.1% to 72% hydrogen in air). The spark-retarding vents help slow the rate of release of hydrogen, but the escaping hydrogen may form an explosive atmosphere around the battery if ventilation is poor.

The ventilation system should be designed to provide an adequate amount of fresh air for the number of batteries being charged. This is essential to prevent an explosion.
Always keep sparks, flames, burning cigarettes, and other sources of ignition away from the battery recharging area. Do not break "live" circuits at the terminals of batteries. Do not lay tools or anything that is metallic on top of any battery.

ARCING AND BURNING OF CONNECTOR

To prevent arcing and burning of the connector contacts, be sure the charger is OFF before connecting or disconnecting the battery. The ammeter should NOT indicate current flow.

MEDICAL AND FIRST AID TREATMENT

First aid facilities and a qualified first aid person should be available for each shift for immediate treatment of electrical shock victims.
EMERGENCY FIRST AID: Call phisician and ambulance immediately and use First Aid techniques recommended by the American Red Cross.

DANGER: ELECTRICAL SHOCK CAN BE FATAL.
If person is unconscious and electric shock is suspected, do not touch person if he or she is in contact with charging equipment, battery, charging leads, or other live electrical parts. Disconnect power at wall switch and then use First Aid.
Dry wood, wooden broom, and other insulating material can be used to move cables, if necessary, away from person.
IF BREATHING IS DIFFICULT, give oxygen.
IF NOT BREATHING, BEGIN ARTIFICIAL BREATHING, such as mouth-to-mouth.
IF PULSE IS ABSENT, BEGIN ARTIFICIAL CIRCULATION, such as external heart massage.

In case of acid in the eyes, flush very well with clean water and obtain professional medical attention immediately.

EQUIPMENT WARNING LABELS

Inspect all precautionary labels on the equipment.
Order and replace all labels that cannot be easily read.

3. DESCRIPTION OF THE CHARGER

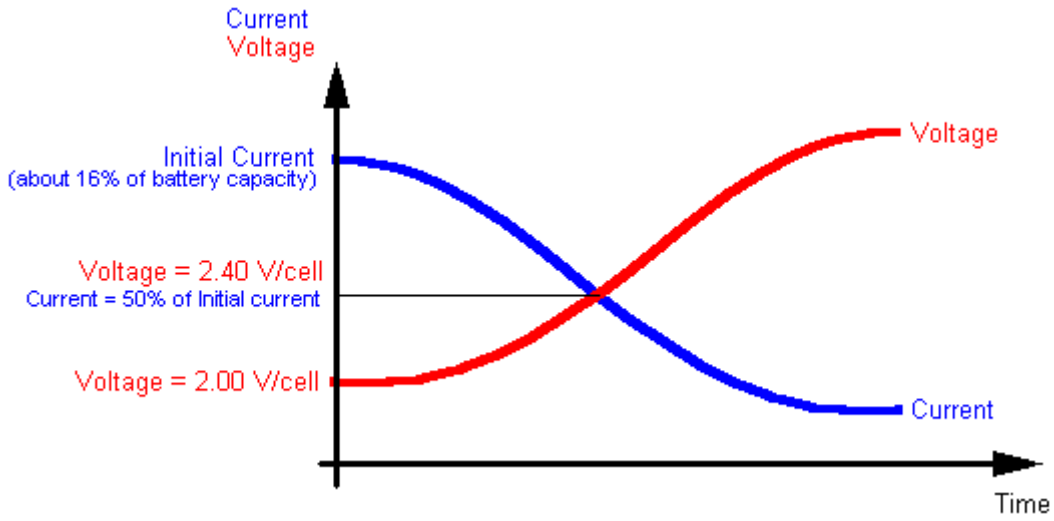
The *Energic Plus MVM* battery chargers have been designed to charge Pb batteries.
These units can convert the AC main supply in a DC output at the correct voltage, in order to charge the battery cells.

The time of charge is set by the mechanical timer.

The output voltage can be selected between the four available values (12-24-36-48V) by moving the selection plug to the required position.

The output current follows the Wa curve, with these initial values.

SELECTED VOLTAGE	*INITIAL CURRENT*
12 V	**50 A**
24 V	**50 A**
36 V	**35 A**
48 V	**30 A**



TECHNICAL DATA

Dimensions:	**43 x 29 x 27(h) cm**
Weight:	**27 kg – 60 lbs**
Battery connection cables:	**cable marked with symbol + and red tape**
	cable marked with symbol -

These are the principal devices included in the charger, available to the user:

- **External box;**
- **Mechanical timer;**
- **Analog ammeter;**
- **Plug and connectors for battery voltage selection**
- **No.2 Cables for battery connection;**
- **No.1 Cable for main supply connection.**

Inside the charger there are the following devices, not available to the user:

- **Power transformer;**
- **Rectifier;**
- **Termination for input cable connection;**
- **TAPS for input voltage adjustment;**
- **Output fuse.**

4. INSTALLATION OF THE CHARGER

Conditions of use:

- **Operating temperature:** **5°C to 45°C**
- **Storage temperature:** **-20°C to 60°C**
- **Relative humidity:** **less than 75%**

Caution: **The charger can be installed by qualified personnel only.**

Attention: **Check that the unit's maximum input power is available from your power supply. Check that the unit's operating voltage is identical to your local power supply.**

Attention: **To prevent fire or shock hazard, do not expose the unit to rain or moisture.**
Do not use the unit in presence of flammable gas, because it can generate sparks.

Caution: **To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.**

Attention: **Allow adequate air circulation to prevent internal heat buildup.**
Do not place the unit near materials that may block the ventilation slots.
Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.

CONNECTION OF THE CHARGER

- **Check the efficiency of earth circuitry;**
- **Connect the charger to the mains using an adequate plug, with switch and fuses;**
- **Use an adequate plug to connect the charger to the battery;**

MAIN SUPPLY VOLTAGE PRESET

Attention: These settings can be done by qualified personnel only.
For more information please contact the manufacturer.

The charger is set by default in position 2 (input voltage 240 Vac). If the input voltage is different, the output current may change. It's possible to adjust the charge current by following these steps:

- **Disconnect the charger from main supply and battery;**
- **Open the cabinet;**
- **Find the plugs for input voltage setting;**
- **Disconnect the wire A from the original plug;**
- **Connect the wire A to the correct position (220, 230, 240 or 250 Vac);**
- **Close the cabinet;**
- **Connect the charger to main supply.**

POSITION	4	3	2	1
VOLTAGE	250	240	230	220

5. HOW TO USE THE CHARGER

HOW TO CONNECT THE BATTERY

- **Check that the charger is switched OFF**;
- **Select the battery voltage by moving the selection plug to the proper connector;**
- **Connect the charger to the battery;**

CHARGE OPERATION

Move the timer clockwise to start the charger.
Read immediately the output current on the ammeter, to make sure that it's not too high, otherwise the output fuse of the charger will blow.

Attention: The operations described in this chapter are done by *Energic Plus MVM* chargers automatically.

Attention: This battery charger is not automatic, therefore if it's not set properly the battery may be damaged.
It's necessary to survey the operation and keep the battery temperature always under control while it's connected to the charger.

END OF THE CHARGE

When the timer reaches the position zero, the charger switches off.
If it's necessary to interrupt the charge before the normal termination, it's necessary to switch of the charger by moving the timer manually to zero.

Attention: Before disconnecting the battery, make sure that the charger is off, to avoid dangerous sparks between connectors.

6. TECHNICAL DOCUMENTS

This manual includes the following technical documents:

- **ELECTRIC DIAGRAM**